

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference BP111242/JVN	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/FI2005/000134	International filing date (day/month/year) 04.03.2005	Priority date (day/month/year) 04.03.2004	
International Patent Classification (IPC) or national classification and IPC INV. G01F1/00 G01F1/80 G01F1/88			
Applicant ABB OY et al.			
<ol style="list-style-type: none"> 1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of 6 sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau a total of 17 sheets, as follows: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions). 			
<ol style="list-style-type: none"> 4. This report contains indications relating to the following items: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Box No. I Basis of the report <input type="checkbox"/> Box No. II Priority <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input type="checkbox"/> Box No. IV Lack of unity of invention <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI Certain documents cited <input type="checkbox"/> Box No. VII Certain defects in the international application <input type="checkbox"/> Box No. VIII Certain observations on the international application 			
Date of submission of the demand 03.01.2006		Date of completion of this report 21.06.2006	
Name and mailing address of the international preliminary examining authority: <div style="display: flex; align-items: center;"> <div> European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016 </div> </div>		Authorized officer Barthélemy, M Telephone No. +31 70 340-4376	



**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/FI2005/000134

Box No. 1 Basis of the report

1. With regard to the **language**, this report is based on
- ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3(a) and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4(a))
 - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-12 received on 03.01.2006 with letter of 03.01.2006

Claims, Numbers

1-23 received on 03.01.2006 with letter of 03.01.2006

Drawings, Sheets

1/4-4/4 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/figs
- ☐ the sequence listing (*specify*):
- ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/FI2005/000134

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-23
	No: Claims	

Inventive step (IS)	Yes: Claims	
	No: Claims	1-23

Industrial applicability (IA)	Yes: Claims	1-23
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

**INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(SEPARATE SHEET)**

International application No.

PCT/FI2005/000134

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1 Reference is made to the following documents:

- D1: US-A-4 108 574 (BARTLEY ET AL) 22 August 1978 (1978-08-22)
- D2: GB-A-2 313 197 (ADVANCED ENERGY MONITORING SYSTEMS LIMITED) 19 November 1997 (1997-11-19)
- D3: WO 03/031918 A (ABB AB) 17 April 2003 (2003-04-17)

2 Claims 1 and 11

2.0 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1 and 11 does not involve an inventive step in the sense of Article 33(3) PCT.

2.1 The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and discloses (the references in parentheses applying to this document) a method for measuring a flow in a pump system, in which a liquid flow is generated by means of a pump and the pump is actuated by an electric drive, in which the rotation speed of an alternating-current motor is controlled with a control unit, wherein the method comprises:

- measuring a pump power in the pump system,
- measuring a static pressure,
- measuring the speed rotation of the pump,
- determining an estimate of a total pressure on the basis of the static pressure and the estimate of the dynamic pressure,
- determining a first estimate of the liquid flow on the basis of the measured pump power and rotation speed variables,
- determining a second estimate of the liquid flow on the basis of the estimate of a total pressure and rotation speed variables and

-determining the flow measurement result by a logical selection or any other predetermined function on said first and second estimate.

2.2 The subject-matter of claim 1 therefore differs from this known method in that the method further comprises:

- determining a new estimate of a dynamic pressure on the basis of the flow measurement result,
- re-determining the estimate of a total pressure on the basis of the static pressure and the new estimate of the dynamic pressure,
- re-determining a second estimate of the liquid flow on the basis of the estimate of a total pressure and rotation speed variables,
- re-determining the flow measurement result by a logical selection or any other predetermined function on said first and second estimate.

2.3 The method of D1 takes the dynamic pressure into account by setting the diameters of the input and output pipes to be the same (see D1, column 9, lines 1-5). This eliminates the dynamic component of the "total pressure" due to the difference in the inertial forces between the input and the output of the pump. If these diameters are different, said dynamic pressure has then to be taken into account. The problem to be solved by the present invention may therefore be regarded as how to take the dynamic pressure into account when inlet and outlet pipes have different diameters.

2.4 The solution proposed in claim 1 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons. A solution would be to add sensing means which would enable the dynamic pressure measurement. This would however complicate the measuring equipment and increase its related costs and maintenance problems. D1 gives a hint to a different solution (D1, column 9, lines 8-11): a simple and straightforward way to deal with this parameter is to compute it by using the Bernoulli equation, i.e. the definition of the total pressure as sum of the static and the dynamic pressures, and the expression along a flow line of the conservation of energy, i.e. total pressures and gains or losses of head. Not knowing a parameter and being unable to measure it, it is standard practice for the person skilled in the art to give a first estimation and after calculation of an end result with said estimation, to recalculate a second estimation of

said parameter and to re-iterate the calculation once or several times. A person skilled in the art would thus use the Bernoulli equation by estimating the dynamic pressure head and make one or several iterations for adjusting said estimated parameter.

- 2.5 The same reasoning applies, mutatis mutandis, to the subject-matter of the corresponding independent claim 11, which therefore is also considered not inventive.

3 Claims 2-10 and 12-23

Dependent claims 2-10 and 12-23 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, see documents D1, D2 and D3 and the corresponding passages cited in the search report.